Bangalore Electricity Supply Company Limited

(Wholly owned by Government of Karnataka Undertaking)

DETAILED SPECIFICATIONS OF FRC WITH EPOXY RESIN COATED INSULATION GOS OPERATING ROD/HANDLE (T – Shaped)

1. **SCOPE:** This technical specification covers design, manufacture, testing, inspection and supply of FRC with epoxy resin coating insulated GOS Operating handle/Rod for GOS.
2. **GROSS WEIGHT:**. Approx 6.0Kgs
3. **LENGTH:** Length of the Rod 3.5 Ft. 2.5Ft Handle FRC with epoxy resin coated on Handle & Rod. G.I. Pipe of 32mm Dia (25NB) of Class-C as per IS- 1239(Part-1)-2004
4. **TOP PLATE & PIN MATERIAL:** MS Plate of Size 50x105x6mm welded to GOS operating pipe at the Top with 2 Nos. of M.S. Pins each of size 12mm Dia of length 60mm.
5. **STANDARDS: The** Indian/International Standards, which shall mean latest revision, with amendments/changes adopted and published, unless specifically stated otherwise in the Specification, shall be referred while accessing conformity of powermen Electrical FRC with epoxy resin coating insulated GOS Operating handle.
6. **FRC WITH EPOXY RESIN COATING INSULATED HANDLE:** The handle and pipe should be uniformly coated FRC with epoxy resin insulation of 12kV Voltage Class, minimum thickness of 6.0mm. The colour of the insulation shall be having Brown/Grey

Electrical Characteristics

Sl.No	Description	Specified values
1	Nominal system Voltage	11kV (rms)
2	Highest System Voltage	12kV (rms)
3	Working voltage	7.5kV (rms)
3	Proof of test Voltage	17kV (rms)
4	Minimum break down Voltage	20kV (rms)
5	Leakage current (rms) at working voltage max	4000μA
6	Leakage Current (rms) at 17kV(rms)	14mA
7	Di-electric Strength of	28kV/mm

7. **GI PIPE REQUIREMENTS**

a) The G.I. Pipe of Class-C Seamless steel tube of Heavy with Nominal Bore 25mm (25NB) as per IS 1239(Part-1):2004 Table-5 which is detailed as below.

Nominal Bore	Outer Diameter		Thickness	Mass of the Tube
mm	Max (mm)	Min (mm)	mm	Kg/mtr
25	34.2	33.3	4	2.93

b) The tolerance on Thickness and Mass shall be as per IS 1239(Part-1) -2004 Clause-9

c) The Chemical composition of the steel tube shall comply with Table-1 of IS 1239: (Part1):2004clause6.1.1as below

Carbon - 0.20% (Max)
Manganese - 1.30% (Max)
Sulphur - 0.04% (Max)
Phosphorus - 0.04% (Max)

d) The GI tube/Pipe shall Zinc coating as per IS 4736:1986 Hot dip zinc coating on MS tubes.

8. FRC WITH EPOXY RESIN COATING INSULATED REQUIREMENTS: Fiber Reinforced Composite with epoxy resin Coating (FRC) is used as an insulation material, particularly for high-voltage applications. FRCs can create an insulating layer that helps to prevent electric and heat shock. The 11kV insulation, FRCs, coatings shall also providing a fire-resistant barrier and insulation against heat and high voltage.

FRC with epoxy resin coated insulation shall be of thickness 6.0mm on G.I GOS operating pipe as shown in the BESCOM Drawing BESCOM/ GM/ QS&S/54 R[illegible]-002 Dated 24-11-2018

9. WORKMANSHIP AND FINISH

1. All the sharp edges shall be rounded off.
2. The G.I. pipe & insulation shall be free from cracks, seams, pits, burrs and other visual defects.
3. The complete body of the GOS Rod shall Zinc coated as per IS- 4736/1986 and FRC with epoxy resin coating shall be done on the handle and rod as shown in Drawing.
4. Provide a non-slip grip (Rubberized coating) to handle and prevent slippage.

10. TESTING

a) PROOF (TEST) VOLTAGE AND LEAKAGE CURRENT

Insulated operating GOS rod shall withstand the 50 Hz ac proof (test) voltage (rms value) The test voltage of 17000 V shall be applied continuously for 1 minute and coated insulation shall withstand it without breakdown and the leakage current shall not be more than 14 mA.

b) BREAKDOWN VOLTAGE

Insulated GOS operating rod when tested shall not breakdown at voltage 20,000V or below the value shown in table-4 of IS: 4770: 1991.

c) SAMPLE BATCH FOR TYPE TESTING

The bidder shall offer material for sample selection for type testing only at CPRI after getting Quality Assurance Programme approved by the BESCOM. The type test shall constitute following tests.

1. Thickness of insulation
2. Mass of Zinc coating on GI pipe.(110gms/m^2)
3. Puncture resistance test FRC insulating material
4. Moisture absorption test of FRC insulating material
5. Proof voltage and leakage current test as per IS: 4770: 1991.

6. Breakdown voltage test as per IS: 4770: 1991.
7. Dielectric test – 28kV/mm
8. Bending load upto 500N- No deflection

d) **RANDOM SAMPLE TEST:** On receipt of the specified lots of Insulated GOS operating rod from the factory at site/stores by BESCOM, a team consisting of one person from the supplier, one person from BESCOM shall select a 3 samples from each lot and conduct all type tests at CPRI Bangalore only. Payment of type testing charges will be considered after the receipt of satisfactory results.
In case of failure, the entire lot will be rejected and in the mean while the supplier/Manufacturer shall have to replace the entire lot with good quality Insulated operating GOS rod **or** In the event of the manufacturer inability to adhere to the aforesaid provisions, suitable penal action will be taken against the manufacturer which may inter alia include blacklisting of the firm for future business with the purchaser for a certain period.

The following type test to be conduct for the

1. Visual and Dimensional verification
2. Marking verifications as specification
3. Thickness of insulation
4. Mass of Zinc coating on GI pipe. (110gms/m^2)
5. Puncture resistance test FRC insulating material
6. Moisture absorption test of FRC insulating material
7. Proof voltage and leakage current test as per IS: 4770: 1991.
8. Breakdown voltage test as per IS: 4770: 1991.
9. Dielectric test – 28kV/mm
10. Bending load upto 500N- No deflection

11. INSPECTION

The material for inspection shall be offered by the supplier only under packed condition. The BESCOM shall select 10% of samples at random from the packed lot for carrying out acceptance tests.

Following shall constitute acceptance test

1. Visual and Dimensional verification
2. Marking verifications as specification
3. Thickness of insulation
4. Mass of Zinc coating on GI pipe.
5. Proof voltage and leakage current test
6. Breakdown voltage test

12. MARKING AND PACKING:

The following particulars shall be stamped on the body:

a) Manufacturer's name or trade-mark
b) Safety label on the rod as " Insulated for 17kV Do not use if insulation damaged"
c) Month and year of manufacture
d) Property of "BESCOM".
e) Batch Hologram Nos. (B000001)

08/05/25

13. DESPATCH:

The Supplier shall commence only after the sample is approved.

14. PACKING & FORWARDING:

The Insulating GOS operating rod shall be packed suitably. The supplier is responsible for any damage to the equipment due to improper and inadequate packing. The contractor without any extra cost shall supply any material found short without any extra cost.

05/05/15

General Manager (El.)
Quality Standards and Safety,